

### Remarks

The Applicants have amended Claims 1 and 6 to restore the original range of Cr. Claims 1 and 6 have also been amended to include the subject matter of Claims 3 and 12, respectively. Claims 3 and 12 have accordingly been cancelled. Claims 4 and 5 have been amended to account for the cancellation of Claim 3.

New Claims 13 and 14 have been added. They recite that the steel composition further comprises selected quantities of selected elemental components. Support for the addition of these components may be found on pages 20 and 21 of the Applicants' specification.

Claims 1 – 12 stand rejected under 35 U.S.C. §103 over JP '462 or '231. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying both publications against the claims. The Applicants respectfully submit, however, that neither publication renders Claims 1 – 12 obvious. Reasons are set forth below.

Prior to addressing the individual publications, the Applicants provide several introductory comments with respect to Claims 1 and 6. Claims 1 and 6 recite a Ti-containing ferritic stainless steel sheet, wherein the grain size number of ferrite grains is 6.0 or more, and the average diameter  $D_p$  of precipitations, each being [(a long axis length of a Ti base precipitate and a short axis length thereof)/2], of the Ti base precipitates in the steel sheet is in the range of from 0.05  $\mu\text{m}$ .

The Applicants discovered that instead of reducing the P content in the steel as much as possible to suppress precipitation of carbides and phosphides, in consideration of recycling of slag and dust, when the P content is allowed to remain in an appropriate amount as a starting material in a steel refining step so that the load required for refining decreases, and when the size and amount of Ti base precipitates in the steel sheet and the grain size number of ferrite grain thereof are controlled in predetermined ranges, the ductility and the  $r$  value of the hot-rolled and cold-rolled sheets are

improved. Thus, the P content is at least 0.01%. By having the P content remaining at an appropriate amount, precipitation of FeTiP is fostered and by strengthening the solid solution of P and controlling the size of FeTiP to be larger, a decrease of the function of strengthening precipitation is achieved.

The Applicants respectfully submit that Claims 1 -- 12 readily distinguish over JP '462. JP '462 discloses high purity ferritic stainless steel sheets having excellent strength at high temperatures. Page 2, column 2, paragraph 0008 to page 3, paragraph 0009 of JP '462 discloses that the main object is to improve strength at high temperatures wherein the maximum feature is characterized by setting the P content, which is precipitated as FeTiP, to 0.01% or less, that is to say, decrease the amount of precipitated P content as low as possible. Also, to achieve the best effect, addition of Mg, in addition to compound addition of Nb-Ti, is specified as a basic composition.

According to the rejection, Nb: 0.5% or less is set forth in the Applicants' specification. However, this means that in a case where Nb is added, a maximum of 0.5% Nb is added. On the other hand, in a case when Nb is not added, the level of Nb content is substantially lower than the range of Nb content of 0.1 to 0.8% specified in JP '462. As a practical matter, the level of incidental impurities is Nb: 0.01% or less and this is outside of the range of 0.1 to 0.8% disclosed in JP '462.

As mentioned above, JP '462 differs from amended Claims 1 and 6 in terms of the required composition (indispensable Nb addition) necessary for obtaining desired characteristic feature. Moreover, as a method of improving the characteristic feature according to JP '462, precipitation of FeTiP is suppressed. In sharp contrast, improving the characteristic feature of Claims 1 to 6 is achieved by fostering FeTiP precipitation. Thus, the Applicants take an opposite approach to JP '462 and use a controlling precipitation that is contrary to JP '462.

It therefore becomes apparent that the Applicants take the opposite approach of JP '462 by deliberately causing FeTiP precipitation while JP '462 teaches suppression of FeTiP precipitation. The Applicants respectfully submit that when a patent applicant does the opposite of what the prior art teaches, this is excellent evidence of non-obviousness over the cited prior art. That is exactly the case in this instance. The Applicants respectfully submit that Claims 1 – 12 are patentable over JP '462. Withdrawal of the rejection is respectfully requested.

JP '231 discloses a method of manufacturing a high purity ferritic stainless steel sheet having excellent ridging properties. In particular, JP '231 discloses, on page 2 in paragraph 0004 in the left column, a manufacturing method by which ridging is decreased through optimization of slab reheating temperature, coiling temperature and hot-rolled sheet annealing temperature, thereby dividing and grain-refining ferrite bands (which are the main cause of ridging). Thus, JP '231 seeks to improve ridging properties. In sharp contrast, Claims 1 and 6 seek to improve ductility and r-value and decrease YS. Hence, the objectives of the Applicants and JP '231 are clearly dissimilar.

The method for obtaining the objectives in JP '231 is disclosed in the manufacturing method as only controlling the temperature and does not refer to the influence of precipitates, as is recited in Claims 1 and 6. As discussed above, there are substantial differences between JP '231 and Claims 1 and 6, in the methods of improving properties, in addition to differences in manufacturing methods and the composition of the products.

The rejection with respect to JP '231 does not utilize the term “inherent,” but the rejection at least partially relies on inherency based on alleged overlap of elemental compositions and alleged similarity in methods. It should be remembered, however, that relying on inherency requires that the allegedly inherent characteristic or feature is “necessarily” present. It is not enough that it is possible that such characteristic or feature could be present or that such a characteristic or feature may be

present. The MPEP is quite clear that the characteristic or feature must “necessarily” be present. With that background in mind, the Applicants invite the Examiner’s attention to further aspects of JP ‘231, particularly with respect to the Ti based precipitates.

JP ‘231 discloses a manufacturing method of subjecting steel containing 10 to 12 mass % Cr, 0.02 mass % or less C, 0.02 mass % or less N and 5 (C+N) to 0.8 mass % Ti to hot rolled sheet annealing for executing holding in the temperature range of 830 to 870°C for 2 hours or more.

On the other hand, when examining the Applicants’ amounts of Cr, there are steel 11 and steel 12 (inventive examples of Table 6) which coincide with the amounts of Cr in a range of 10 to 12 mass % which is specified by JP ‘231. An examination of the precipitation nose temperature T (°C) of precipitates in Table 6 indicates that the precipitation nose temperatures T (°C) of Ti base precipitates of steel 11 and steel 12 are 720°C and 700°C, respectively, and when the range specified in the Applicants’ Claim 1 of hot rolled sheet annealing temperature [a precipitation nose temperature T (°C) of Ti base precipitates  $\pm 50^\circ\text{C}$ ] is applied,  $720^\circ\text{C} \pm 50^\circ\text{C}$  and  $700^\circ\text{C} \pm 50^\circ\text{C}$  are obtained and these temperatures do not satisfy the range of the heat treatment temperature of 830 to 870°C disclosed in JP ‘231.

In addition to the foregoing, when the range specified in the Applicant’s Claim 9 of cold rolled sheet finish annealing temperature (the precipitation nose temperature T (°C) of Ti base precipitates  $\pm 100^\circ\text{C}$ ) is applied,  $720^\circ\text{C} \pm 100^\circ\text{C}$  and  $700^\circ\text{C} \pm 100^\circ\text{C}$  are obtained and these temperatures do not satisfy the range of the heat treatment temperature of 830 to 870°C disclosed in JP ‘231.

That is to say, when the steel (10 to 12 mass % Cr steel) of JP ‘231 is held in a temperature range of 830°C to 870°C for two hours, coarsening of the crystal grain size of the hot rolled sheet and fining (dissolution/disappearance) of FeTiP are presumed to occur and the characteristics of the

Applicants' steels not satisfied. In other words, those skilled in the art can reasonably conclude that the FeTiP precipitated in the steel of JP '231 and FeTiP precipitated in the claimed steels are not precipitates of the same configuration. Inasmuch as those skilled in the art realize that the Ti based precipitates of JP '231 are likely to be different from those of the Applicants' claimed steels, the Applicants respectfully submit that the position in the rejection based on inherency must fail. The Applicants have demonstrated that the precipitates are not "necessarily" present. In fact, the Applicants have demonstrated that the Ti based precipitates are likely not present. Thus, inherency does not apply and JP '231 is inapplicable. Withdrawal of the rejection based on JP '231 is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury  
Reg. No. 31,750

TDC/sh  
(215) 656-3381